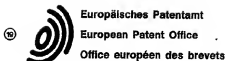


11407XE1

B2 3619-R7



⑪ Publication number:

0 342 033
A1

⑫

EUROPEAN PATENT APPLICATION

⑬ Application number: 89304777.9

⑭ Int. Cl.⁴: **C 25 C 3/16**

⑮ Date of filing: 11.05.89

⑯ Priority: 11.05.88 NO 882083

⑰ Date of publication of application:
15.11.89 Bulletin 89/46

⑱ Designated Contracting States: **DE ES FR GB IT**

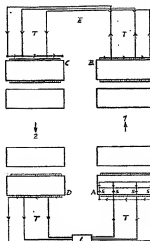
⑲ Applicant: **NORSK HYDRO A.S.**
Bygdey Allé 2
N-0257 Oslo 2 (NO)

⑳ Inventor: **Nebelli, Hans Georg Tidemann**
Arnulf Overlands Veg 159
N-0784 Oslo 7 (NO)

㉑ Representative: **Allen, Oliver John Richard et al**
Lloyd Wise, Tregear & Co. Norman House 105-109 Strand
London, WC2R 0AE (GB)

㉒ **Arrangement for the compensation of damaging magnetic fields on transversely disposed electrolysis cells.**

㉓ A potline for the electrolytic production of aluminium comprising at least two rows of reduction cells (1 and 2) with the cells arranged transversely in each row. The electric current is conducted to and from the end cells by three or more asymmetrically arranged supply bars (T) via a distribution bar (A,B,C,D) on each end cell, so that a net current is formed in the distribution bar, providing compensation for the magnetic influence from the rectifier field and end cell field.



EP 0 342 033 A1

Description

ARRANGEMENT FOR THE COMPENSATION OF DAMAGING MAGNETIC FIELDS ON TRANSVERSELY DISPOSED ELECTROLYSIS CELLS

This invention relates to a potline for the electrolytic production of aluminium which provides compensation for the unwanted electromagnetic influence from the rectifier and the end cells of the potline.

It is of great importance for the economical production of aluminium by electrolysis that the electrical energy is used in the most efficient way. It is also very important that the various parts of the busbar arrangement, which conducts the current from the rectifier to the first electrolytic cell in the row, from the last cell in said row to the first cell in the neighbouring row and then from the last cell to the rectifier, are positioned so as to minimize the magnetic field induced in the cells.

A typical arrangement of the aluminium electrolytic cells is to position the cells transversely in rows with the electric current being conducted from one cell to the next and from one row to the next. The direction of the current in one row will be opposite to the current direction in the neighbouring row.

The present electrolytic process utilizes a current of 200 to 300 kA. This current induces large magnetic fields affecting the neighbouring rows and cells causing great problems because the magnetic fields influence the molten metal forming the cathode in the bottom of each cell.

The distance between two rows of cells in a potline is normally such that the only effect on the neighbouring row will be the vertical component of the magnetic field. To compensate for the unwanted or bias field component caused by the neighbouring row, a higher current is normally passed around or under the short end facing the neighbouring row rather than to other parts of the transversely arranged electrolysis cells.

The first and last cell (end cells) of every row are the cells which are most exposed to the electromagnetic field, because they are influenced by the magnetic field both from the neighbouring row and from the busbars conducting the current from one end of the potline area back to the rectifier and, at the other end, conducting the current from one row to the next (between the end cells). This influence can be reduced by increasing the distance between the rectifier and the potline, and by increasing the distance from the last cell in a row to the transverse busbar leading the current to the neighbouring row. This is however an expensive method, giving unnecessary long busbars and requiring a large area.

A potline for the electrolytic production of aluminium, in accordance with the invention, comprises at least two rows of reduction cells with the cells arranged transversely in each row and is characterised in that the electric current is conducted to and from the end cells by three or more asymmetrically arranged supply bars via a distribution bar on each end cell, so that a net current is formed in the distribution bar, providing compensation for the

magnetic influence from the rectifier field and end cell field.

This arrangement reduces the installation costs by reducing the busbar length and saves space by reducing the distance between the rectifier and the potline at one end and between the transverse busbar and the potline at the other end of the potline.

The invention will now be explained in detail by way of example, with reference to the accompanying drawing illustrating a potline according to the invention.

The drawing illustrates the end cells of the row of cells and not the whole row of cells. It is also understood that by using well-known technology the rows per se are stabilized with respect to influence from the neighbouring row.

Electric current from the rectifier L is carried in three or more supply bars T to the first end cells in row 1, and is connected asymmetrically to a distribution bar A comprising four or more risers S being symmetrically positioned with respect to the cell. This arrangement will give a net electric current in the distribution bar A conducted from right to left and provides compensation for the first end cell in row 1. The electric current is thereafter conducted from the cathode of an upstream cell to the anode of the next downstream cell, as normal, and to the other end cell in row 1.

The electric current is conducted from this second end cell to a distribution bar B. The current is then conducted from the distribution bar to the first cell in the neighbouring row 2 seen in the current direction via three or more supply bars T asymmetrically positioned with respect to the midpoint of the distribution bar B. This arrangement gives a net current in the distribution bar B from left to right and provides the necessary extra compensation for this other end cell in row 1.

The electric current is further conducted to a distribution bar C on the first cell in the row 2 by means of asymmetrically arranged supply bars T. Thereafter the current is conducted from the cathode of an upstream cell to the anode of the next downstream cell, as normal, to the other end cell in the row 2. From this other end cell in row 2 the current is conducted to a distribution bar D. The current is then conducted via three or more supply bars T, being asymmetrically arranged with respect to the midpoint of the distribution bar D, back to the rectifier L, as illustrated in the drawing.

It is obvious that the dimensioning and positioning of the distribution bars, the risers and the supply bars in the rectifier field and end field will determine the current intensity in the distribution bar, and the level of compensation for the end cells.

The practical arrangement of the invention will be solved by normal construction procedures, with respect to the numerous factors and conditions which are considered when building and planning an

aluminium potline with a high current intensity and reduced magnetic field. Normally, only the end cells in a potline with a current above 200 kA need extra compensation.

Claims

1. A potline for the electrolytic production of aluminium comprising at least two rows of

reduction cells with the cells arranged transversely in each row, characterized in that the electric current is conducted to and from the end cells by three or more asymmetrically arranged supply bars (T) via a distribution bar (A,B,C,D) on each end cell, so that a net current is formed in the distribution bar, providing compensation for the magnetic influence from the rectifier field and end cell field.

5

10

15

20

25

30

35

40

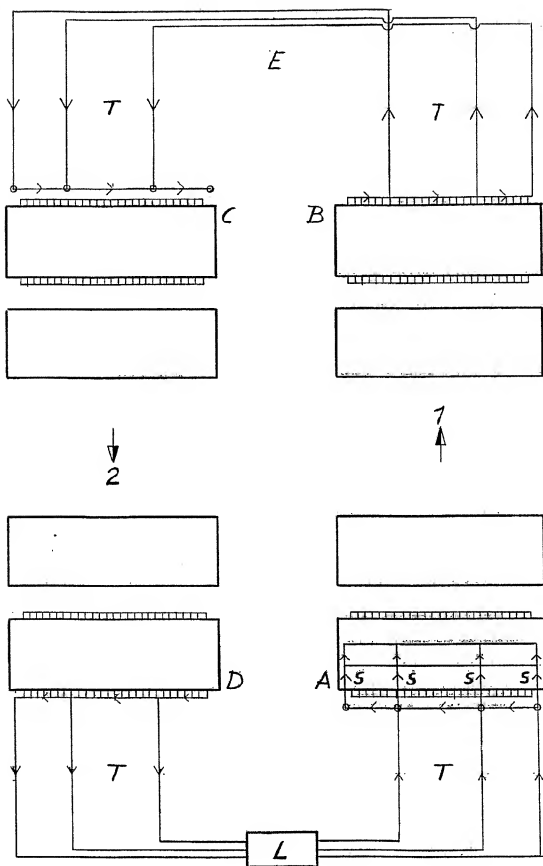
45

50

55

60

65





European Patent
Office

EUROPEAN SEARCH REPORT

Application number

EP 89304777.9

DOCUMENTS CONSIDERED TO BE RELEVANT			Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
Category	Citation of document with indication, where appropriate, of relevant passages			
A	<u>US - A - 3 756 938</u> (NEBELL) * Fig.; claim 1 *	1	C 25 C 3/16	
A	<u>DE - A - 2 139 527</u> (WSESOJUSNIJ) * Fig.; claim 1 *	1		
A	<u>EP - A1 - 0 185 822</u> (ALCAN) * Abstract *	1		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)	
			C 25 C	
Place of search VIENNA		Date of completion of the search 09-08-1989	Examiner LUX	
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>				